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THE DECLINING TUBERCULOSIS DEATHRATE

A sharply declining deathrate from tuberculosis is the most gratifying item in the favorable mortality picture of the year 1927, to date. In the first three months of 1927, the mortality from pulmonary tuberculosis among the Metropolitan Life Insurance Company's Industrial policyholders declined nearly seven per cent. from the figure for the corresponding period of last year. The deathrate for white lives at the end of the first quarter was at the astoundingly low figure of 70.9 per 100,000. Since the mortality in the first part of the year is always much higher than at other seasons, it is almost certain that the full year of 1927 will set a new low record and probably by a large margin. Only sixteen years ago, in 1911, the pulmonary tuberculosis deathrate for white persons was practically three times as high as at present. Among the colored, a large rate of decline has also been observed during this period, indicating that the improvement is not limited to any one race or to any single area of the country. We have every reason to believe that the same condition will be found to prevail in the general population as well as among these insured lives because the experience of this cross-section of the population has always been found to parallel that for the whole population with respect to tuberculosis mortality.

The outlook for the future in the field of tuberculosis reduction is, therefore, very encouraging. In 1922, Dr. DUBLIN, Statistician of the Metropolitan, suggested that the mortality rate from tuberculosis would continue to decline and that in all probability it would drop to 50 per 100,000 by the year 1930. The record of the last five years has been consistent with this estimate. Unless there is a marked check in the current rate of decline, this very much desired goal of the tuberculosis campaign is likely to be achieved. It is only necessary that the present era of prosperity continue with full employment at high wages for the workers of the country and that the efficient pre-

ventive and educational work of public and private health agencies be maintained at a high level.

The time is, therefore, in sight when tuberculosis will no longer be the scourge of early adult life but will assume a relatively minor position as a cause of sickness and death. In this connection, it is possible that not enough consideration has been given to certain epidemiological characteristics of the disease which are likely to play an important part in still further reducing the deathrate. Tuberculosis is an infectious disease; and as such is subject to certain limitations which have been found to affect other infectious diseases. The ever-decreasing number of deaths mean correspondingly fewer advanced cases; and as each advanced case is a focus for new infections, the reduction in their number will reduce the number of primary infections in the new generation. It is entirely possible that we shall soon have reached a point at which the number of new cases arising by infection from the existing advanced cases will be insufficient to maintain a significant level of new infections. In that case, it would seem that the disease must ultimately disappear or at least be reduced to a rare phenomenon. We may, on this basis, look to new and sharp declines in the deathrate from tuberculosis in the immediate future. The Metropolitan intends to investigate the statistical material available on this subject to ascertain whether it contains evidence in support of the above supposition.

THE BURDEN OF THE HANDICAPPED

At a conservative estimate, there are well over a million persons in the United States seriously handicapped or wholly incapacitated, as wage-earners, by various physical or mental impairments. All these persons represent a social burden, A census of the handicapped is thus of general significance. Omitting from consideration cases of ordinary sickness, there are, according to recent statistics, in the United States about 75,000 blind; 45,000 deaf and dumb, and an alarmingly large contingent of mentally defective or deranged. Counting only those interned in institutions, these comprise nearly 43,000 feeble-minded,* nearly 9,000 epileptics,† and over 268,000 mentally diseased. Then there are 78,000 paupers in institutions, of whom the majority, however, are old people. Lastly, many persons, about 700,000 according to one estimate, are crippled to an extent interfering more or less seriously with their earning capacity.

*This figure is exclusive of 12,183 feeble-minded in almshouses.

†This figure is exclusive of 4,159 epileptics in institutions for feeble-minded and 10,016 in institutions for the insane and 1,066 in almshouses.

We have, in past issues of the BULLETIN, presented a series of articles on the Value of a Man. These articles were conceived with the normal man in view. But it is clear that society must reckon also with the substandard individual, who finds it difficult or impossible to take sufficient share in the world's productive work to render him self-supporting, or who, at best, is very liable to fall below the average of earning power. It is impossible to form any accurate estimate of the cost, to the community, of all the impairments of which note has been taken above. Only with regard to certain disabilities do we have any numerical data regarding their depressing effect on the earnings of those thus handicapped. In the case of blind persons, the average earnings of those who replied to questionnaires regarding this point were $560 annually for males above age ten, and $300 for females. It is thus probably a safe estimate that blindness reduces a man's earning capacity by at least two-thirds, if he is able to find employment at all—for the figures quoted relate only to those who were gainfully employed, and therefore exclude those who had no earnings whatever.

As it must cost about $500 a year per person to maintain the blind in the United States we may, from a crude economic standpoint, look upon these impaired lives as liabilities rather than assets. The total cost of maintaining them must be over thirty-seven million dollars per annum, of which we may assume that not more than one-fifth is earned by the blind themselves.

The economic loss by deaf-mutism is somewhat less heavy. About sixty percent of these, among males, are employed, and about eighteen per cent. among females. The average annual earnings of those employed are about $1,000 for males and $500 for females. The deaf-mutes, as a class, are therefore essentially self-supporting, or nearly so.

In round numbers, the maintenance of the blind and the deaf and dumb in the United States must cost over thirty million dollars per annum in excess of their earnings. This, however, does not represent the whole measure of the economic loss, the diminution of the value of the individual, caused by these impairments. For, the same persons, if normal, would earn three or four times the very low figure which we have here used to represent their cost of maintenance; and these excess earnings beyond the cost of maintenance are thus lost to the community.

As to cripples, it seems hopeless to attempt even a very rough estimate of the losses occasioned by the stunting of their productive lives, since their impairments vary so greatly in character and extent. But the amount of such losses is undoubtedly enormous even though

the term *cripple* does include persons with minor injuries which only slightly reduce their earning capacity. Somewhat better are the opportunities for gauging the cost to the State of mental defectives and insane. A partial idea of the social burden which is placed upon the general population by these mentally incompetent persons can be gathered from Government reports on institutions devoted to their care. In 1923, fifty state institutions (out of a total of fifty-four) reported a total of 36,713 feeble-minded persons under their care, exclusive of those on parole. These required a staff of over 5,500 physicians, nurses and attendants or an average of one employee per 6.6 feeble-minded persons. The property tied up in these institutions represented a capital of $41,486,092 or $1,227 per patient, and the cost of maintenance was $10,457,616 during the year 1922. This represents an expenditure per patient, of $310. State institutions for epileptics in the United States numbered ten in 1923, of which nine reported a population of 7,755 patients. The personnel of attending physicians, nurses, etc., corresponds to 6.0 patients per employee. The value of the capital tied up in these institutions was $10,519,353, and the annual cost of maintenance, for seven of the institutions, was $2,104,371. The running cost per patient was $324 per annum. These figures relate to *state* institutions for feeble-minded and epileptics. In addition to these, other special institutions, as well as almshouses, give shelter and care to many mentally incompetent persons. The greatest number of mentally incompetent patients were the insane, who, on January 1, 1923, numbered 267,617 persons, counting only those committed to hospitals for mental disease. This makes the total population of persons mentally incompetent to lead an independent existence, aside from those in almhouses, close to 320,000. For every 300 of the total population, there is about one person thus dependent upon the help of those having a normal wage-earning capacity. Or, at the rate of 4.3 persons per family, on an average, it may be said that every seventy families support one mental incompetent, counting only those that are placed in institutions. The NATIONAL COMMITTEE FOR MENTAL HYGIENE estimates very conservatively that the economic loss resulting from mental disease amounts annually to three hundred millions of dollars.

There is still another set of substandard persons from the standpoint of economics, namely, delinquents and criminals. They cost the taxpayers of the United States huge sums annually.

Only the roughest estimate of the total loss to the country from various forms of physical and mental handicap can be formed. Much

additional accounting by the interested agencies, both public and private, is called for to give definite form to the total figures. Undoubtedly, the totals run into the billions annually, even if we omit from reckoning a loss of well over two billions of dollars occasioned by the ordinary cases of sickness. It may be that a certain amount of handicapping is inevitable in a highly organized state. But it will be well to recognize how great a burden is occasioned for the productive members of society through this source. Crippling and mental disease is expensive to all concerned, and moderate, well-directed expenditures will repay large dividends if they prevent such handicapping and mental defects, or even if they succeed merely in reducing the period of incapacity.

THE INCREASING USE OF INSULIN AND THE DIABETES DEATHRATE

In spite of the general use of insulin, disappointing reports continue to come from several countries with regard to the increasing deathrate from diabetes. So great was the expectation of the medical profession and of the general public that insulin would rapidly decrease the number of deaths, that the rising mortality in 1925, and again in 1926, has raised some question as to the permanent efficacy of this therapeutic agent. Those who are most expert in the use of the drug continue to have great faith in it. Nevertheless, there is need for careful analysis of the deathrate to discover in what color, sex and age groups the increase is actually occurring. Such an analysis undoubtedly throws considerable light on the whole situation. The material of the Metropolitan Life Insurance Company, covering the period of 1911 to 1926, lends itself to such a purpose, and we call attention, below, to some of the high spots in a study just completed.

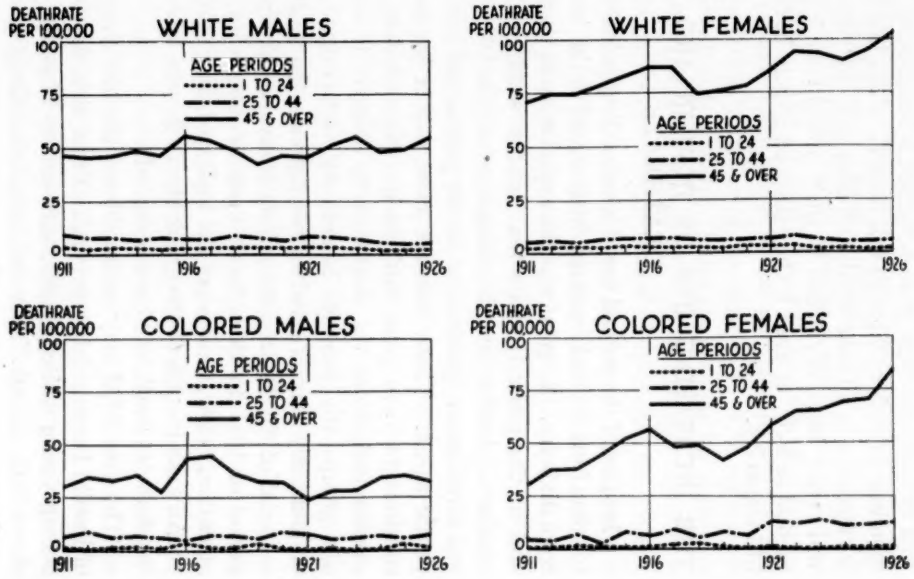
An examination of the graph shows at once where the increases in the diabetes deathrate have occurred.

The year 1923 may be considered the first year in which the use of insulin became fairly general. From that date onward, the rates among young white persons, ages one to 24 years, have, in general, shown little change. There has been a slight improvement in the deathrate in the age group 25 to 44 among white males and females. After age 45, there was improvement shown, at first, for both white males and females; but this did not persist. The tendency again was upward in 1925 and 1926, especially among females. The advent and continued use of insulin has had no favorable effect among the colored of either sex, in any year, in so far as we can judge by the course of the deathrate.

DIABETES MELLITUS

DEATHRATE BY AGE PERIODS. WHITE AND COLORED PERSONS

METROPOLITAN LIFE INSURANCE CO INDUSTRIAL DEPARTMENT 1911 TO 1926



It is probable, however, that, as a race, they have not received insulin treatment to the same relative extent as the whites. In view of the fact that the deathrates after age 45 are increasing and that the great bulk of deaths occurs at these ages, there is no wonder that the average age at death of diabetics has increased during the last few years. It is also safe to say that in this, as well as in the earlier age periods, insulin has prolonged the lives of many diabetics. Thus, among white males, the average age at death has increased almost two years since 1923, and among white females, almost a year. The only exception is among colored males, where there has been a decrease.

These facts are entirely consistent with the experience of clinicians, who have found that the best results from the use of insulin are experienced in the younger ages, where, heretofore, this disease ran an extraordinarily rapid course to its fatal termination. The use of insulin not only delays the progress of the disease, but it is reported that in some instances it has actually resulted in a regeneration of pancreatic tissue.

The outstanding fact brought out by this analysis is the rising deathrate among females, not only since the use of insulin but dating back a number of years prior to the development of this agent. It was only during the period of the war years that the diabetes deathrate declined appreciably in this sex, indicating perhaps the effect of the decreased consumption of sugar and of other luxuries. But after 1920, the rate again rose and has continued to rise since. This has resulted in a marked increase in the relative excess of the deathrate of females over that of males. As will be observed in the chart on page 6, the rate for females at the older ages is now almost twice as high as for males.

It is possible only to conjecture at this time what the effect of the insulin treatment has been on the deathrate. Taking all the facts together, it would seem safe to say that at best, the use of this drug has postponed the date of death in many cases. There are indications, however, that the number of diabetics is constantly increasing, possibly reflecting the current mode of life, the increasing ease of living, the generally richer diets, etc. But for the increasing use of insulin, the deathrate would, in all probability, have been even higher. That is the only comfort one can get from the figures at hand.

THE CASE RATE, DEATHRATE AND CASE-FATALITY RATE FROM TYPHOID FEVER

The serious outbreak of typhoid fever in Montreal, in recent months, makes timely the following discussion of certain epidemiological factors in this disease.

The age period of greatest liability to infection with typhoid fever is 10 to 14 years; but the period which registers the highest deathrate from this disease is 15 to 19 years. In all age groups between 15 and 55 years the actual typhoid deathrate is higher than during the period of maximum occurrence of the disease, that is, 10 to 14 years. The actual danger of fatal termination in typhoid cases, as shown by the case-fatality rates, increases continuously with age after 5 to 9 years, and is greatest in old age, the very period where liability to infection is least. These facts have been developed by the Metropolitan Life Insurance Company in a study of the case-incidence, the mortality and the lethality from typhoid, in New Jersey, during the five-year period, 1920 to 1924.

In the 3,980 cases studied the case-incidence rose from 11.4 per 100,000 of population, among children under five years of age, to a maximum of 40.1 in the age group 10 to 14 years; and then recorded a continuous decline throughout the remainder of the life span. The deathrate was lowest under five years of age and highest between 15 and 19 years.

The minimum case-fatality, or lethal rate was recorded in the age period 5 to 9 years, although this age group is one of the three highest with respect to the hazard of infection. The case-fatality rate rose with age, reaching a maximum of 50 deaths per 100 cases in old age.

There are marked differences in these three ratios when considered by sex. In all age groups, except 55 to 64 years, typhoid fever occurs more frequently among males than among females. Between 15 and 54 years of age the deathrate is also higher among males. The case-fatality rate for males, like the deathrate, is lower than that for females under 15 years of age and higher between 15 and 54 years of age. Beyond age 55 and under age 15, the case fatality rate of females exceeds that of males.

These and other facts on the comparative case-incidence, mortality-rate and case-fatality rate will be set forth in a monograph on typhoid fever which is being prepared at the present time.

HEALTH RECORD FOR APRIL, 1927

The deathrate among the industrial populations of the United States and Canada, as measured by that of the Metropolitan Industrial policyholders, was 9.5 per 1,000 in April. *This is the lowest rate ever recorded for this month among this large cross-section of the population.*

For the fourth successive month of the current year, the deathrate has registered a decline over that for the corresponding month of 1926.

The drop in April, however, was more pronounced than for any of the three preceding months, and amounted to 21.6 per cent. There was also the usual seasonal decline from the mortality in March.

Every important cause of death except typhoid fever, diphtheria, accidents, suicides, and automobile fatalities recorded a lower rate in April than during the same month of 1926, the most conspicuous declines being those for measles, whooping cough, influenza, heart disease, pneumonia, and chronic nephritis. The continued low rate for tuberculosis is another gratifying item, which gives renewed ground for the hope that a new minimum death rate for this disease will be registered this year. Puerperal conditions have shown declines in three of the four elapsed months of 1927.

A very high deathrate (6.7 per 100,000) was registered for typhoid fever. This, in fact, is the highest April mortality we have ever recorded for this disease, and is about the figure we might expect in the autumn when typhoid reaches its maximum mortality. The high rate in April, nevertheless, did not arise from *general* prevalence of this disease. It is based upon 99 actual deaths of which 80 occurred in Canada. There was an extensive outbreak of typhoid in Montreal during March and April, which has been only recently reported as under control. The Canadian health authorities believe that the source of infection was a typhoid carrier who was connected with a milk pasteurization plant. The U. S. PUBLIC HEALTH SERVICE has urged the various state health officers to take every precaution to prevent the spread of this disease in the United States—more especially through the employment of persons from Montreal as food handlers in summer resorts and recreation camps. The UNITED STATES PUBLIC HEALTH SERVICE also emphasizes the value of inoculation against typhoid as a protection for persons who are necessarily exposed to insanitary conditions or who must travel to places where conditions of sanitation are either questionable or unknown.

The diphtheria situation, while still less favorable than during the early months of last year, is improving, the April deathrate of 9.7 per 100,000 being 28.7 per cent. below that of January.

The suicide rate is still running high, and for the fourth successive month exceeded that in 1926. The record for automobile fatalities also compares unfavorably with last year. The rate for all accidents as a group, shows a small increase and that for homicides a considerable decrease.

The general deathrate for the large cities of the United States in April was 13.8 per 1,000, which shows a considerable drop as compared

with April, 1926 (16.6). All of the important acute infectious diseases except malaria, were less prevalent in April than in March. As compared with April, 1926, however, more cases were reported of diphtheria, scarlet fever, smallpox, typhoid fever, malaria, and poliomyelitis, with lower prevalence of influenza, measles, and whooping cough.

The decline in diphtheria, as compared with March, was slight but fairly general. Louisiana was an exception, reporting a rise to 119 cases during the first three weeks of April, as compared with 54 during the same period in March. Reports of influenza cases showed approximately one-sixth of the number at this time a year ago. Case reports of measles show substantially no change since March. In some states, notably California and Illinois, this disease was much less prevalent, but there was more of it in Washington, North Carolina, Wisconsin and Kansas.

There were two outstanding items of public health interest during April, namely, a bad typhoid fever situation in Montreal, and conditions incidental to the Mississippi flood. A conference dealing with relief measures was held at Memphis on April 28th. Reports indicated that the flooded area and the refugee camps had been surveyed, that no epidemics had been reported, and that for the present, sanitary and medical problems are well in hand. It may well be, nevertheless, that difficult sanitary and health problems will have to be met later.

The following table shows the mortality among the Industrial policyholders for April, 1927; March, 1927; April, 1926, and the year 1926:

METROPOLITAN LIFE INSURANCE COMPANY

Deathrates* per 100,000 for Principal Causes, Premium-paying Business in Industrial Department (Annual Basis)

MONTHS OF APRIL, 1927; MARCH, 1927, AND OF APRIL, 1926

CAUSES OF DEATH	RATE PER 100,000 LIVES EXPOSED*			
	Apr. 1927	Mar. 1927	Apr. 1926	Year 1926†
TOTAL—ALL CAUSES	954.1	1028.5	1216.8	942.7
Typhoid fever	6.7	3.0	2.5	4.2
Measles	7.5	7.9	21.6	10.2
Scarlet fever	3.8	4.9	5.1	3.4
Whooping cough	7.6	8.3	15.6	9.6
Diphtheria	9.7	11.3	9.1	9.7
Influenza	27.1	32.3	92.6	31.0
Tuberculosis (All forms)	107.2	114.1	116.5	98.7
Tuberculosis of resp'y system	95.0	100.3	100.9	86.5
Cancer	77.0	77.2	78.2	73.5
Diabetes mellitus	17.5	19.2	20.4	16.7
Cerebral hemorrhage	56.6	58.9	62.1	55.5
Organic diseases of heart	137.3	149.4	174.3	133.9
Pneumonia (All forms)	110.7	119.9	193.7	97.9
Other respiratory diseases	16.6	19.9	19.9	13.1
Diarrhea and enteritis	15.2	16.3	18.0	29.8
Bright's disease (Chronic nephritis)	66.1	79.6	83.8	73.3
Puerperal state	14.7	17.2	18.2	15.3
Suicides	8.9	9.9	7.7	7.6
Homicides	6.0	8.1	7.7	7.0
Other external causes (excluding suicides and homicides)	54.8	55.9	53.8	62.2
Traumatism by automobiles	15.7	12.3	13.7	16.7
All other causes	203.2	215.0	215.7	190.4

*All figures include infants insured under one year of age.
†Based on provisional estimate of lives exposed to risk in 1926.

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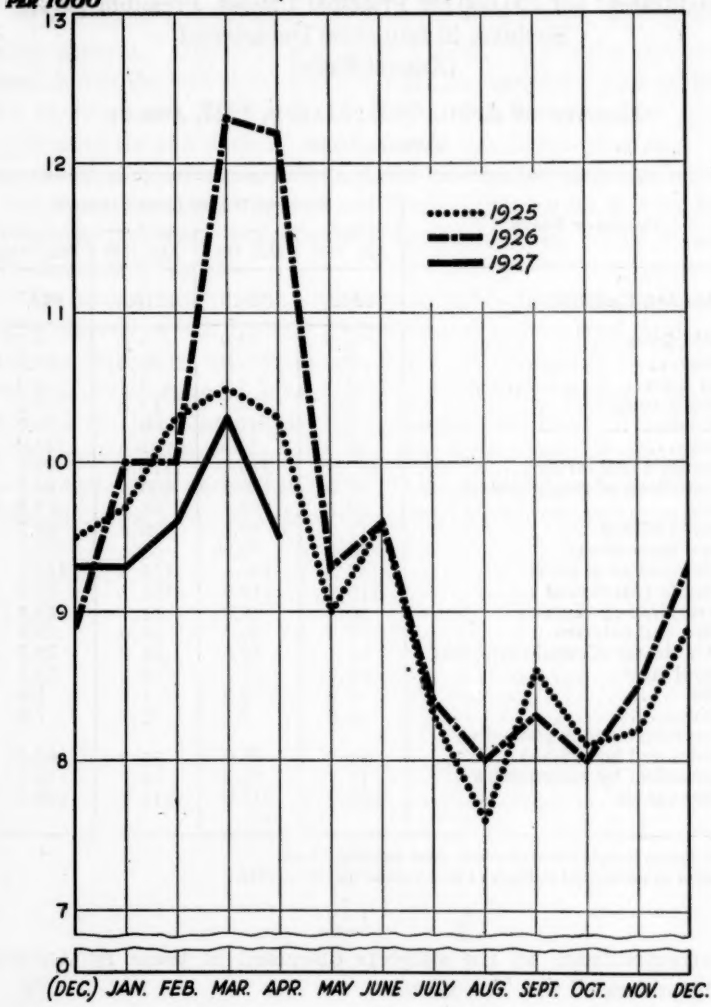
Deathrates from All Causes

METROPOLITAN LIFE INSURANCE CO.
INDUSTRIAL DEPARTMENT
(ANNUAL BASIS)



	(DEC.)	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1925		9.7	10.3	10.5	10.3	9.0	9.6	8.3	7.6	8.6	8.1	8.2	8.9
1926		10.0	10.0	12.3	12.2	9.3	9.6	8.4	8.0	8.3	8.0	8.5	9.3
1927		9.3	9.6	10.3	9.5								

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